

What is claimed is:

1. A rotary press apparatus comprising:
  - a first rotating member;
  - a second rotating member;
  - a first ram having a first ram face and first and second ram ends,wherein the first ram end is rotatably coupled to the first rotating member at an off-center position of the first rotating member and the second ram end is rotatably coupled to the second rotating member at an off-center position of the second rotating member;
  - a third rotating member;
  - a fourth rotating member; and
  - a second ram having a second ram face and third and fourth ram ends,wherein the third ram end is rotatably coupled to the third rotating member at an off-center position of the third rotating member and the fourth ram end is rotatably coupled to the fourth rotating member at an off-center position of the fourth rotating member, and wherein rotation of the first, second, third, and fourth rotating members causes the first and second ram faces to move relative to each other and to reciprocate in opposing directions along substantially parallel paths.
2. An apparatus as defined in claim 1, wherein complimentary cutting tool members are mechanically coupled to the first and second ram faces.
3. An apparatus as defined in claim 2, wherein the complimentary cutting tool members are configured to cut a moving material.

4. An apparatus as defined in claim 1, wherein the complimentary cutting tool members include a punch and a die
5. An apparatus as defined in claim 1, wherein the substantially parallel paths are substantially coplanar.
6. An apparatus as defined in claim 1, wherein a first guide member is mechanically coupled to the first ram.
7. An apparatus as defined in claim 6, wherein the first guide member comprises a linear guide.
8. An apparatus as defined in claim 6, wherein a second guide member is mechanically coupled to the second ram and to the first guide member.
9. An apparatus as defined in claim 8, wherein the second guide member comprises a linear guide.
10. An apparatus as defined in claim 8, wherein the second guide member is slidably coupled to the first guide member.
11. An apparatus as defined in claim 1, wherein the first rotating member comprises a first gear.

12. An apparatus as defined in claim 11, wherein the third rotating member comprises a second gear that is in direct engagement with the first gear.

13. An apparatus as defined in claim 1, wherein the first ram end is rotatably coupled to the first rotating member by a rotating bearing.

14. An apparatus as defined in claim 13, wherein the rotating bearing is coupled to a stub shaft protruding from the first rotating member.

15. An apparatus as defined in claim 1, wherein the first rotating member counter-rotates relative to the third rotating member during operation of the apparatus.

16. An apparatus as defined in claim 1, wherein the first and second ram faces follow respective eccentric paths during operation of the apparatus.

17. A rotary press apparatus comprising:  
a first ram rotatably coupled between a first rotating member and a second rotating member in an off-center position relative to a rotational axis of the first and second rotating members; and  
a second ram rotatably coupled between a third rotating member and a fourth rotating member in an off-center position relative to a rotational axis of the third and fourth rotating members.

18. An apparatus as defined in claim 17, wherein a first cutting tool member is coupled to the first ram.

19. An apparatus as defined in claim 18, wherein a second cutting tool member is coupled to the second ram in a substantially opposing relationship to the first cutting tool member.

20. An apparatus as defined in claim 19, wherein the first and second cutting tool members comprise a punch and die set.

21. An apparatus as defined in claim 19, wherein the first and second cutting tool members comprise a cut-off blade and ram set.

22. An apparatus as defined in claim 17, wherein the first and third rotating members are engaged in a direct drive configuration.

23. An apparatus as defined in claim 17, wherein a guide member is mechanically coupled to the first ram.

24. An apparatus as defined in claim 17, wherein a guide member is mechanically coupled to the second ram.

25. An apparatus as defined in claim 17, wherein the first ram is rotatably coupled to the first rotating member by a rotating bearing.

26. An apparatus as defined in claim 25, wherein the rotating bearing is rotatably coupled to a stub shaft protruding from the first rotating member.

27. An apparatus as defined in claim 17, wherein the first rotating member counter-rotates relative to the third rotating member during operation of the apparatus.

28. A rotary press system comprising:  
a first ram rotatably coupled to at least one rotating member and configured to follow at least a portion of a first generally elliptical path so that at least a portion of the first ram travels in a first direction along the at least a portion of the first generally elliptical path relative to a rotational axis of the at least one rotating member; and

a second ram rotatably coupled to at least another rotating member and configured to follow at least a portion of a second generally elliptical path so that at least a portion of the second ram travels in a second direction opposite of the first direction along the at least a portion of the second generally elliptical path relative to a rotational axis of the at least another rotating member.

29. A system as defined in claim 28, wherein a first material cutting device is coupled to the first ram.

30. A system as defined in claim 29, wherein a second material cutting device is coupled to the second ram generally facing the first material cutting device.

31. A system as defined in claim 30, wherein the first and second material cutting devices cooperate to cut a continuously moving material during operation of the apparatus.

32. A system as defined in claim 28, wherein the first ram and the second ram are configured to move toward opposing surfaces of a moving material.

33. A system as defined in claim 28, wherein the first and second rams are configured to move relative to each other along substantially opposing parallel paths.

34. A system as defined in claim 28, wherein the at least one rotating member and the at least another rotating member are engaged to one another in a direct drive configuration.

35. A system as defined in claim 28, wherein the first generally elliptical path includes a generally circular path.

36. A system as defined in claim 28, wherein the second generally elliptical path includes a generally circular path.

37. A method for cutting a moving material, the method comprising:
- moving a first face of a first ram along at least a portion of a first eccentric path and rotating the first ram so that the first face remains substantially parallel to the moving material;
  - moving a second face of a second ram along at least a portion of a second eccentric path and rotating the second ram so that the second face remains substantially parallel to the moving material;
  - cutting the moving material as the first and second ram faces pass through a pressing position associated with the first and second eccentric paths.
38. A method as defined in claim 37, wherein cutting the moving material includes at least one of shearing and punching the moving material.
39. A method as defined in claim 37, wherein cutting the moving material comprises engaging a cut-off blade and a cut-off ram on opposing surfaces of the moving material.
40. A method as defined in claim 37, wherein cutting the moving material comprises engaging a punch and a die on opposing sides of the moving material.

41. A method as defined in claim 37, wherein moving the first face of the first ram along at least a portion of the first eccentric path comprises moving the first ram along the at least the portion of the first eccentric path in a counter-rotating direction relative to moving the second face of the second ram along at least the portion of the second eccentric path.

42. A method as defined in claim 37, wherein moving the first ram along the at least a portion of the first eccentric path and moving the second ram along the at least a portion of the second eccentric path comprises moving the first ram and the second ram along guide members.



43. A system for producing a product from a moving material, the system comprising:

a shearing rotary press configured to produce a plurality of material segments by repeatedly shearing the moving material;

a punching rotary press operatively coupled to the shearing rotary press and configured to punch at least some of the plurality of material segments; and

a roll-former unit operatively coupled to the punching rotary press configured to roll form the plurality of material segments, wherein at least one of the shearing rotary press and the punching rotary press includes a first rotating member, a second rotating member, a third rotating member, a fourth rotating member, a first ram, and a second ram, wherein the first ram comprises a first ram face and first and second ram ends, wherein the first ram end is rotatably coupled to the first rotating member at an off-center position of the first rotating member and the second ram end is rotatably coupled to the second rotating member at an off-center position of the second rotating member, wherein the second ram comprises a second ram face and third and fourth ram ends, wherein the third ram end is rotatably coupled to the third rotating member at an off-center position of the third rotating member and the fourth ram end is rotatably coupled to the fourth rotating member at an off-center position of the fourth rotating member, and wherein rotation of the first, second, third, and fourth rotating members causes the first and second ram faces to move relative to each other and to reciprocate in opposing directions along substantially parallel paths.

44. A system as defined in claim 43, wherein complimentary cutting tool members are mechanically coupled to the first and second ram faces.

45. A system as defined in claim 44, wherein the complimentary cutting tool members are configured to cut a moving material.

46. A system as defined in claim 43, wherein the plurality of material segments move through the shearing rotary press, the punching rotary press, and the roll-former unit in a substantially continuous manner.

47. A system as defined in claim 43, wherein the shearing rotary press includes a cut-off blade and a cut-off ram.

48. A system as defined in claim 43, wherein the punching rotary press includes a punch and die set.

49. A method of producing a product from a moving material, the method comprising:

shearing the moving material;

punching the moving material; and

roll forming the moving material to produce the product,

wherein at least one of shearing the moving material and punching the moving material comprises moving a first face of a first ram along at least a portion of a first eccentric path, rotating the first ram so that the first face remains substantially parallel to the moving material, moving a second face of a second ram along at least a portion of a second eccentric path, rotating the second ram so that the second face remains substantially parallel to the moving material, and cutting the moving material as the first and second ram faces pass through a pressing position associated with the first and second eccentric paths.

50. A method as defined in claim 49, wherein cutting the moving material comprises engaging a cut-off blade and a cut-off ram on opposing surfaces of the moving material.

51. A method as defined in claim 49, wherein cutting the moving material comprises engaging a punch and a die on opposing sides of the moving material.

52. A method as defined in claim 49, wherein the moving material moves through at least part of a material processing system in a substantially continuous manner.

53. A method as defined in claim 49, wherein moving the first face of the first ram along at least a portion of a first eccentric path comprises moving the first ram along the at least the portion of the first eccentric path in a counter-rotating direction relative to moving the second face of the second ram along at least the portion of the second eccentric path.

54. A method as defined in claim 49, wherein moving the first ram along the at least a portion of the first eccentric path and moving the second ram along the at least a portion of the second eccentric path comprises moving the first ram and the second ram along guide members.